

## SECTION 02751 - CEMENT CONCRETE PAVEMENT

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes exterior cement concrete pavement for the following:
  - 1. Driveways and roadways.
  - 2. Curbs and gutters.
  - 3. Walkways.
- B. Related Sections include the following:
  - 1. Division 2 Section "Earthwork" for subgrade preparation, grading, and subbase course.
  - 2. Division 2 Section "Pavement Joint Sealants" for joint sealants of joints in concrete pavement and at isolation joints of concrete pavement with adjacent construction.

#### 1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Field quality-control test reports.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

#### 1.5 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

## PART 2 - PRODUCTS

### 2.1 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
  - 1. Use flexible or curved forms for curves with a radius 100 feet (30.5 m) or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
  - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

## PART 3 – EXECUTION

### 3.1 CONCRETE MIXTURE

- A. Composition Of Concrete: Concrete shall be proportioned in accordance with Section 501.02(L) of the City of Omaha Standard Specifications for Public Works Construction, latest edition.

Concrete for pavement placed using self-propelled concrete spreaders shall be L 6 Air-Entrained or L 65 Air-Entrained, as indicated in the PLANS. Concrete for pavement to be placed using hand finishing methods shall be L 65 Air-Entrained. Concrete mixes, including cement types, shall not be changed during a continuous placement. Prior to any concrete placement, the CONTRACTOR shall submit the mix proportions for the concrete to be supplied and a certification by the concrete supplier that the proposed mix(es) conform to City of Omaha Standard Specifications for Public Works Construction, latest edition.

- B. Plant Checks: Contractor shall provide Contracting Officer's Representative with documentation of current plant certification per Section 501.03(A) of the City of Omaha Standard Specifications for Public Works Construction, latest edition. Certification shall be provided for all plants that are used on project. Plant checks of the concrete batching plant will generally be performed prior to large pours, especially if adverse weather conditions prevail, or at any other time deemed appropriate. The Contracting Officer's Representative will determine when a plant check is required and will so notify the testing laboratory, who may make a no-notice plant check. The plant check will be in general compliance with the City of Omaha Standard Specifications for Public Works Construction, latest edition and will include the collection of a cement sample. If the materials or plant operation are found to be in non-conformance with the City of Omaha Standard Specifications for Public Works Construction, latest edition, no additional concrete shall be batched or placed until the problem(s) is(are) corrected.

- 3.2 FIELD TESTING OF P.C.C.: The types of tests required and the frequency of testing for P.C.C. shall be as specified in these Project Specifications and the City of Omaha Materials and Testing Manual except as modified below:

- a. Slump tests shall be conducted according to the requirements of ASTM C 143. Slump tests shall be made for each set of cylinders or as required by the Engineer. Concrete slump requirements, as listed in Table 501.01 of the City of Omaha Standard Specifications

for Public Works Construction, latest edition, are 2.5"±1.5" for Formed Pavement and 1.5"±1.5" for Slip Formed Pavement.

- b. Air content tests shall be conducted according to the requirements of ASTM C 231, or ASTM C 173. If test by either method indicates non-compliance the concrete shall be rejected. There shall be no Pay Factor calculations, for either pay reductions or bonuses, based on Air Content. Air content tests shall be made for each set of cylinders or as required by the Engineer. Air content, per Table 501.01 of the City of Omaha Standard Specifications for Public Works Construction, latest edition, shall be 6.5% ± 1%.
  - c. Compressive Strength tests shall be made in accordance with the requirements of ASTM C39. Compressive Strength specimens shall be made and cured according to the requirements of ASTM C 39. Testing shall be based on the frequencies in Table 45.01 of the City of Omaha Materials and Testing Manual. A sample shall be considered a set of three cylinders. One compressive strength test shall be made on the 7th day after concrete placement. The remaining two cylinders shall be tested on the 28th day after concrete placement. The concrete paving represented by the beams shall be considered acceptable if the average strength of the two 28-day cylinders is greater than the strengths listed in Table 501.01 of the Project Specifications. If the average of the 28 day compressive strengths is below the required strength, the pay factors shown in Table 501.02 shall be applied to the pavement area represented by the deficient strength sample.
  - d. Concrete testing shall be conducted every 150 cubic yards of concrete poured or once per day when pouring.
  - e. If an anomaly resulting from casting a cylinder is visible in the cylinder, or if an anomaly is observed during the breaking of a cylinder, the results of that cylinder's test shall be discarded. If a cylinder's test results are discarded due to either the described anomalies or an out of tolerance break location per ASTM C 39, then the paving represented by the cylinders shall be considered acceptable if the compressive strength of the remaining 28-day cylinders is greater than the strength listed in Table 501.01 of the City of Omaha Standard Specifications for Public Works Construction, latest edition.
  - f. The area represented by a compressive strength test shall be the full width of pavement extending along the centerline in both directions covering the calculated area based on the testing frequency volumes. This area will be the area of pavement to be accepted, paid for at reduced price or removed and replaced, as applicable, for each test set. Removal and replacement shall be to the next transverse joint beyond the halfway point from the under strength test.
  - g. If the Contracting Officer's Representative believes cylinder and core test results are indicative of a concrete materials problem, he may order chemical and petrographic testing of samples of the in-place concrete and of any samples collected during the plant check.
- 3.3 Pavement Thickness: Pavement thickness shall be verified by coring in accordance with ASTM C174, Standard Test Method for Measuring the Thickness of Concrete Elements Using Drilled Concrete Cores.
- a. Lot Size: Lot size for thickness testing shall be 300 CY each of concrete placed.
  - b. Testing Frequency: Each lot shall have three core samples taken. Locations for the sampling shall be randomly generated.

- c. Measurement:
  - i. Cores measuring greater than the design thickness shall be considered the design thickness for the lot thickness averaging.
  - ii. Individual cores measuring greater than 1.0" deficient in thickness shall be cause for the removal and replacement of the deficient thickness area. This area shall be established, at the Contractors expense, by taking additional cores at 25 ft intervals longitudinally, each direction from the deficient core, until cores of the design thickness are obtained. The removal and replacement area shall be the entire width of pavement, from the joint nearest each end of the defined area. The removal and replacement of the deficient pavement shall be at no additional expense to the owner.
    - 1. The two end cores shall be used in place of the original rejected core in calculating the lot average.
- 3.4 Concrete Placement Time Limit: Concrete not placed within 90 minutes after batching shall be considered rejected and shall not be used in the paving operation. Concrete discharged from the truck prior to the 90 minute expiration limit and which remains unused and unfinished past the 90 minute point shall not be used in the paving operation. All rejected concrete shall be removed from the jobsite and properly disposed of at no additional expense to the owner.
- 3.5 Protecting And Curing Compressive Test Specimens: The CONTRACTOR shall be responsible for protecting and curing of the compressive test specimens for the 24 hours that they remain in the field. If the CONTRACTOR is not satisfied with the standard procedures employed by the testing laboratory to control the curing environment, it shall be the CONTRACTOR'S responsibility to accomplish the following:
  - a. Notify the Contracting Officer within 24 hours;
  - b. Arrange for other than the standard curing precautions; and
  - c. Pay any additional costs associated with the non-standard curing precautions.
- 3.6 INTEGRAL CURB AND GUTTER: All pavement shall have 6" integral curb and gutter (Type A), except where noted on the PLANS. Separate payment will not be made for integral curb and gutter.
- 3.7 WATER FOR FINISHING: In no case shall water be added to the surface of the concrete for finishing. Addition of water for finishing is cause for removal and replacement of the concrete at the CONTRACTOR'S expense.

END OF SECTION 02751